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AN ANALYSIS OF THE CHARACTERISTICS AND PRACTICES OF SELECTED FLORIDA SMALL LIVESTOCK PRODUCERS: A FOCUS ON PRODUCTION AND PROCESSING

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Abstract

The study assessed the characteristics and practices of small livestock producers, emphasizing production and processing. Data were obtained from a convenience sample of seventy small producers from selected counties in Florida, and analyzed using descriptive statistics, including chi-square tests. The socioeconomic characteristics showed that part-time producers, White producers, middle-aged producers, fairly educated producers, and moderate-income producers dominated the group. A majority of the producers practiced rotational grazing, fed a combination of forage and concentrate, and less than half conducted soil tests regularly. Moreover, over half had parasite problems and treated them primarily with anthelmintics. Nearly all producers sold animals live, implying very little processing. Therefore, some processing could be encouraged as value-added products fetch more than raw products. The chi-square tests also revealed that household income, race, farming status, and gender had statistically significant relationships with selected production characteristics.

Keywords: Livestock Producers, Small Producers, Characteristics and Practices, Production and Processing

Introduction

The demand for foods produced using practices or specialty labels, such as local foods, has been growing over recent years. There is currently no consensus for defining "local food systems." The 2008 Farm Bill defined local food as "food that is grown and transported less than 400 miles or within the same state." However, some state organizations use state limits to define local food. According to the USDA ERS (2016), the most recognized definition involves farmers selling directly to consumers. This definition is reflected through selling at farmers markets, roadside markets, and pick-your-own arrangements, or selling products to institutions, such as schools and restaurants, as well as wholesalers.

The USDA NASS (2016) emphasized that another market that is emerging for local foods is the online market. The latter market phenomenon has created additional opportunities for small-scale producers. Furthermore, Low et al. (2015) assessed the trends in U.S. local and regional food systems, and found that about 8% of U.S. farms use direct-to-consumer or intermediate marketing channels. These consisted of mainly farmers markets as well as community supported agricultural systems. Also, the USDA NASS (2016) reported that more than 167,000 U.S. farms produced local foods and sold them through direct marketing, with nearly $9 billion in revenues in 2015; more than 80% of the direct market sales occurred within 100 miles of the farm. The USDA (2016) reported that the total local food sales were $12 billion in 2014, and this is

estimated to be $20 billion by 2019. This increase would provide more jobs and business opportunities for rural America.

The increase in consumer demand for locally produced foods is the result of consumer preferences for the benefits of locally produced foods. For example, Klavinski (2013) stated that consumers believe that local foods are less processed; have a higher nutrient and flavor content due to less spoilage and deterioration; are grown using more agriculturally sustainable methods, and are grown using techniques that can be easily interpreted and conveyed from producer to consumer, compared to non-locally produced foods. The University of Florida (2006) mentioned similar benefits of local food production with emphasis on produce. That is, first, local foods provide more genetic diversity and deliver more variation in produce compared to commercial industries, which normally mass-produce only selective traits in produce. Second, local foods preserve land space. Due to less-intensive systems in small-scale farming, there is less destruction of the ecosystem and this creates a longer lifespan of the land. Wolf et al. (2005) ~~also~~ stressed that important attributes mentioned by consumers who purchased produce at farmers markets were freshness, tastiness, high-quality, good value for the money, locally grown, and sold by the producer. Additionally, Ikerd (2010) explained that preference for local foods stems from a sense of responsibility to increase practices that improve personal health, animal welfare, and cultural and biological diversity.

Ronchi and Nardone (2003) emphasized that there is a push towards sustainability and organic farming, which places focus on alternative practices. These practices include pasture rotations as a solution to minimize the effects of continuous grazing or traditional grazing; co-grazing and pasture rotations to minimize the effects of internal parasites, and crop rotations to reduce land and soil degradation. Relatedly, Iniguez (2011) argued that the demands of traditional ruminant production systems create some challenges for small producers. These challenges include, for example, overgrazing and availability of fodder. Since small producers normally have limited resources, they need alternative means of production in order to conserve their limited resources, or adopt practices that will enhance their operations. Although both crops and animals can be produced locally or regionally using some of the practices mentioned above, one area of interest is locally or regionally produced livestock or livestock products.

As a result of this, there is a need to assess the practices of local or regional small livestock producers in order to ascertain their operational status. The Southeast is of particular interest because of the paucity of such research in this region. Florida is a target state. The purpose of this study, therefore, was to analyze the characteristics and practices of selected Florida small livestock producers, emphasizing production and processing. The specific objectives were to (1) identify and describe socioeconomic characteristics, (2) describe and assess selected production and processing characteristics or practices, and (3) examine the relationships between socioeconomic characteristics and other characteristics or practices. This study is fashioned after Bartlett et al. (2016) for Alabama.

Literature Review

The literature focuses on socioeconomic characteristics of producers, production issues, and processing issues. They are discussed sequentially, and only selected and relevant studies are discussed or highlighted to emphasize the importance of each characteristic to livestock production.

Socioeconomic Characteristics

Fernandez-Cornejo et al. (2007) examined off-farm income, technology adoption, and farm economic performance. The results showed that off-farm employment and off-farm income had an inverse relationship with farm size. Households with a farm income of less than $10,000 earned an off-farm income averaging $54,600; 58% of the operators of these households reported off-farm hours. Contrarily, households with a farm income with $500,000 to $1 million had an average off-farm income of $30,100; less than 20% of the operators of these households reported off-farm hours. Overall, the economic performance of the farm household was improved when off-farm income activities were included in farming enterprise.

Gaul et al. (2009) assessed the characteristics of small farm operations in Florida. The authors reported that 95% were Whites; 58% were between the ages of 45 and 64, and 45% had college degrees. Also, 44% indicated that more than fifty percent of their household income was from the farm; a majority of farms, 64-70%, had an acreage size of 50 or less; 85% had more than five years of experience in farming, and 56% were second-generation farmers.

Sarma and Ahmed (2011) conducted an economic study of small-scale cattle fattening enterprise of Rajbari District, Bangladesh. They reported that 74% of participants were females; 56% were over 50 years old; 11% had a tertiary level education, and 87% had at least five years of farming experience.

McBride and Mathews (2011) examined the diverse structure and organization of U.S beef cow-calf farms. They found that the average age of producers was 60 years, and 40% of cow-calf only farm operators were over 65 years. More than 40% of operators had their primary occupation as off-farm. Average farm income for cow-calf/feedlot farms was $32,000, while the average farm income for cow-calf only farms was less than $15,000. Off-farm incomes had an inverse relationship with net cash farm income, averaging at $72,000 among all beef cow-calf farms (cow-calf only, cow-calf/feedlot, and cow-calf/stocker).

USDA NASS (2014), based on the 2012 Census of Agriculture, reported that for beef cattle systems, 89% of operators were males and 11% were females; 83% were 45 years or older, and 44% were full-time farmers. For sheep and goat systems, 75% of farms were 49 acres or less. In regards to overall producer characteristics, the average age of principal farm operators was 58 years; 14% of operators were women; the average age of individuals involved in day-to-day farm operations was 57 years, of which 27% were women.

Bartlett et al. (2016) analyzed the characteristics and practices of selected Alabama small livestock producers, focusing on production and processing. They reported that 69% of respondents were part-time farmers; 83% were males; 81% were Blacks; 81% were over 45

years; however, 51% were 45-64 years; 65% had at most a two-year or technical degree, and 51% had an annual household of $40,000 or less.

Tessema (2016) evaluated beef cattle production, management practices and marketing system in Lume District of Shoa Zone, Ethiopia. The results revealed that 91% of farm households were male-operated; 59% of household heads were literate, and the overall average age of the heads of household was 46 years.

Production Issues

Winsten et al. (2010) analyzed the barriers to the adoption of management-intensive grazing among dairy farmers in the Northeastern U.S. They reported on three different grazing systems: traditional, confinement feeding, and management-intensive. They found that farmers who used confinement feeding farms were more likely to have more acres of land and had larger-sized farms compared to those who used management-intensive and traditional systems.

USDA NAHMS (2011) evaluated U.S. cow-calf operations. It found that most small-scale producers were of the opinion that production was impacted by parasites and diseases. For instance, for producers with 1 to 49 cows, 59% agreed that external parasites had a major impact on production while 50% agreed that internal parasites hindered production. Also, 59% of operators with 1 to 49 cows used vaccinations compared to 87% of operators who had 50 to 99 cows. In addition, reproductive technologies were used, namely, semen evaluation and palpation. Regarding palpation for pregnancy, 11% of producers with 1 to 49 cows reported using this practice, and 26% of producers with 50 to 99 cows reported using this practice.

Gebeyehu (2012) investigated the challenges and opportunities of goat farming systems in Oromia Regional State, Ethiopia. He reported that households in the region practiced mixed crop-livestock systems with goats being the dominant livestock. The primary source of feed was rain-fed pasture. He also observed that the amounts of pasture were declining and there were feed shortages. He attributed the main cause of this to climate change. Other challenges were high predation rates, shortage of labor, and high prevalence of diseases and parasites, including pneumonia, liver fluke, and internal parasites.

USDA Animal and Plant Health Inspection Service [APHIS] (2012a) analyzed biosecurity in small-scale U.S. livestock operations. It reported that 40% of operations always quarantined new or returning animals to their farms. However, about half of operations (48%) rarely or never quarantined new or returning animals to their farms. Three main reasons were given for not quarantining animals, namely, inadequate labor or time; trusting the source of the new or returning animals, and the lack of a separate enclosure or extra equipment.

USDA APHIS (2012b) carried out a study of small-scale U.S. livestock operations for 2011. It found that 62% used a veterinarian for their livestock or poultry operations during the previous 12-months. More operations in the North Central and West regions used a veterinarian compared to the Northeast or Southern regions. The proportions were, respectively, 73% (North Central), 71% (West), 59% (Northeast), and 55% (South). Of the 38% of operations that did not use a veterinarian, the reasons given were did not have any disease problem or need for a veterinarian; provided own health care for animals, and cost.

Fikru and Gebeyew (2015) examined the challenges and opportunities of sheep and goat production systems in Degenhabur Zone, Eastern Ethiopia. They reported that grazing (natural pasture) is the most common feed source for small ruminants; 95% of sheep and goats spent most of their time grazing for about 6 hours a day, and animals were monitored throughout the day to reduce predation. Many farmers (44%) did not provide supplement feed to goats; yet, the quality of the forage was typically not ideal for nutrients year-round. The main reasons for not feeding supplements were due to the high cost (31%) and lack of accessibility (20%). Also, a major limitation to farmers was feed shortage, particularly during the dry months when inadequate rainfall and lack of water accessibility was common. In fact, 91% of total households had water shortage issues, and feed conservation was rarely practiced. About 33% of farmers had parasites and diseases problems. The most common practice for treating sick/injured animals was through traditional methods performed by household members. Very few farmers (9%) used veterinary services.

Tessema (2016) assessed beef cattle production, management practices and marketing system in Lume District of East Shoa Zone, Ethiopia. He reported that crop residue was the primary feed source for beef cattle. However, communal grazing was also heavily practiced, especially in the wet season. Also, 78% of respondents grazed their cattle alone, while 14% practiced co-grazing their cattle with small ruminants or with equines. Farmers used different sources of water, including pond, river, tap, and well. The major constraints of production were feed and water shortages.

Bartlett et al. (2016) evaluated characteristics and practices of selected Alabama small livestock producers. The results showed that 68% of respondents practiced rotational grazing; 59% fed a combination of forage (direct from pasture), hay and concentrate; 48% conducted soil tests regularly; 59% had internal parasite issues. Of those who reported parasite problems, 36% treated them with anthelmintics. Also, 66% dewormed quarterly or yearly; 79% quarantined newly purchased animals before introducing them to their herds, and 77% used veterinary services.

Processing Issues

Coleman (2008) conducted a study on the demand and options for local meat processing. The author reported that despite the many appeals for small slaughtering facilities, they pose several challenges. First, construction of a facility meeting USDA standards would be very difficult for a small facility to handle. Second, there is the issue of the USDA allotting an inspector for such a small and sporadic slaughter facility when there is a greater need for inspectors at larger, more permanent facilities. Third, there is the matter of fulfilling all the requirements for the state and local authorities. Fourth, there is the issue of local residents who may have concerns with the daily operations of a plant in their locality.

USDA APHIS (2012c) analyzed characteristics of small-scale U.S. Livestock operations. It found that almost 6% of small-scale operators used a USDA mobile slaughter unit for their livestock or poultry; however, about 40% transported live animals to a slaughter facility. A higher percentage of operations in the West transported animals to a slaughter facility compared with operations in the North Central, Northeast, and South (27 vs. 6, 4, and 2%).

Gwin et al. (2013) examined the importance of business commitments for long-term viability of local meat and poultry processing. The authors found that, in most cases, the nearest processing facility was several hours away forcing farmers to drive for long distances. This resulted in a thinner profit margin and higher meat prices to cover costs of transportation and expensive processing costs. They also found that most small farmers believed there were not enough facilities available nearby to process their animals. However, the planning and developing a new processing facility requires a large of amount of capital. Therefore, investors would need assurances from the processors and farmers that they can generate and maintain a large consistent volume of animals to make such ventures profitable.

Dickenson et al. (2013) analyzed the challenges in the local meat industry. They referred to mobile processing units as an emerging potential solution for local small-scale meat producers. They argued that it is beneficial because of its flexibility; however, it is involved mostly with on-farm slaughter rather than complete on-farm processing. These mobile units require standard slaughter facility "gadgets" for processes such as aging, cutting, and packaging. They concluded that mobile processing units are typically privately funded, and this lack of investment from public institutions leads to minimizing slaughter options for local farmers.

Leamy (2014) examined raw milk and local beef processing in diversification activities of Vermont dairy farmers. The author identified current barriers to beef processing, which included infrastructure, seasonality, consistent supply, and biophysical issues. About 38% of farmers stated that infrastructure was a major constraint. This included issues such as inadequate cooling spaces or inadequate slaughter spaces; 25% stated that seasonality was a major constraint. This dealt with the balanced distribution of livestock throughout the course of the year; 25% indicated that a consistent supply was a major constraint; 17% reported that biophysical issues were a significant constraint, including the lack of appropriate animal to land ratios.

Ellsworth (2015) conducted a needs assessment for livestock processing services. The author found that there was a potential for expanding meat slaughter and processing facilities due to the demand for processing facilities. The finding was based on small farmers and stakeholders' interest in investing in meat production facilities. Despite the potential in expansion and development of more processing facilities, potential investors were hesitant to invest unless livestock producers were willing to provide a commitment to the number of animals they would process at the facility. Stakeholders currently invested in meat production facilities face challenges with slaughter and processing; this includes transportation, processing, and packaging costs as well as scheduling of slaughters.

Bartlett et al. (2016) examined the characteristics and practices of selected Alabama small livestock producers. Their results revealed that 87% of respondents sold animals live, no slaughtering or other processing whatsoever. There were very few farmers who were involved with processing; 7% sold animals live but also processed (slaughtered) animals, and 2% only processed (slaughtered) animals (i.e., no live selling). The authors surmised that due to the size of their operations, producers did not think it was worth processing their animals. Alternatively, they argued that producers may be providing their customers what they wanted by not processing (slaughtering).

Methodology

Data Collection

The study used a questionnaire, which comprised three parts, namely, production, processing, and demographic information. The questionnaire was submitted to the Institutional Review Board, Human Subjects Committee of the Institution for approval before being administered. It was distributed to a convenience sample of small livestock producers. This method of sampling was used, because of a lack of a known sampling frame from which subjects could be drawn.

The data were collected by interviewing beef cattle and meat goat producers at several program sites in Florida, and the producers were from 18 Florida counties: Alachua, Bay, Clay, Dixie, Duval, Gadsden, Gulf, Hamilton, Hernando, Hillsborough, Jackson, Jefferson, Leon, Madison, Marion, Polk, Taylor, and Wakulla. The data collection covered the period from the summer of 2013 to the summer of 2015. Extension agents and other technical personnel from Florida A&M University assisted with collecting the data. The sample size was 70, and this was considered adequate for the study.

Data Analysis

The data were analyzed by employing simple descriptive statistics and chi-square tests. The chi-square test description is adapted from Tackie et al. (2015). The chi-square test used was based on the formulation of a null hypothesis (Ho), which states that two variables are independent of (or not related to) each other, and an alternative hypothesis (Ha), which states that two variables are not independent of (or related to) each other. In this study, the null hypothesis and alternative hypothesis are generally stated as:

Ho: A practice or characteristic is independent of (or not related to) selected socioeconomic variables.
Ha: A practice or characteristic is not independent of (or related to) selected socioeconomic variables.
To determine the chi-square, χ^2, the formula below was used:

$$\chi^2 = \sum_{i=1}^{r}\sum_{j=1}^{c} \frac{(fo_{i,j}-fe_{i,j})^2}{fe_{i.}}$$

Where
χ^2 = chi-square
fo = observed frequency
fe = expected frequency
i,j = values in the i^{th} row and j^{th} column, respectively
$\sum$ = summation

The observed frequency is the frequency obtained from the survey, and the expected frequency is calculated from each cell in a contingency table as row total times column total divided by the grand total. If the chi-square is significant, then the null hypothesis that the two variables are independent of each other is rejected; otherwise, it is not rejected. Furthermore, specific hypotheses were stated for rotational grazing, type of feed, soil test, and veterinary services (production characteristics) on the one hand, and socioeconomic variables, on the other.

It was the intent of the authors to test how animals are sold (processing characteristics) with socioeconomic variables. However, this was not done because nearly all the producers (99%) sold their animals live. In the case of soil testing and education, for example, the hypotheses were stated as:

Ho: soil testing is independent of (or not related to) education
Ha: soil testing is not independent of (or related to) education

Similar hypotheses were stated for the other socioeconomic variables: farm status, gender, race/ethnicity, age, and annual household income. Correspondingly, identical hypotheses were stated for the other characteristics and the afore-mentioned socioeconomic variables. The data were input into SPSS 12.0© (MapInfo Corporation, Troy, NY), and frequencies and percentages were assessed. Chi-square tests were conducted to determine relationships between the sets of variables.

Results and Discussion

Table 1 reflects the socioeconomic characteristics of the producers. A majority of the respondents (60%) were part-time farmers and 34% were full-time farmers; equal proportions (50% each) were males and females; 47% were Whites and 41% were Blacks; 52% were between 45-64 years, and 39% were 65 years or older. Also, 73% had at most a two-year/technical degree or some college education; nearly 26% had at least a four-year college degree. Approximately 60% had an annual household income of $40,000 or less, and 36% had an annual household income of more than $40,000. The results are generally similar to those reported by Bartlett et al. (2016) who also found more part-time farmers than full-time farmers, more middle-aged or older producers than younger producers, more producers with a two-year/technical degree or some college education than those with a four-year degree, and more producers with annual household incomes of at most $40,000 than those with higher household incomes. The results differ from Bartlett et al. (2016) regarding gender and race. In that study, there were more male than female producers and more Black producers than White producers. In fact, regarding gender, most studies show more male producers than female producers (e.g., USDA NASS, 2014; Tessema, 2016).

Table 1. Socioeconomic Characteristics (N = 70)

Variable	Frequency	Percent
Farming Status		
Full-time	24	34.3
Part-time	42	60.0
No Response	4	5.7
Gender		
Male	35	50.0
Female	35	50.0
Race/Ethnicity		
Black	29	41.4
White	33	47.1
Hispanic	1	1.4
Other	7	10.0
Age		
20-24 years	0	0.0
25-34 years	1	1.4
35-44 years	5	7.1
45-54 years	13	18.6
55-64 years	23	32.9
65 years or older	27	38.6
No Response	1	1.4
Educational Level		
High School Graduate or Below	23	32.9
Two-Year/Technical Degree	7	10.0
Some College	21	30.0
College Degree	16	22.9
Post-Graduate/Professional Degree	2	2.9
No Response	1	1.4
Annual Household Income		
$10,000 or less	5	7.1
$10,001-20,000	5	7.1
$20,001-30,000	18	25.7
$30,001-40,000	23	20.0
$40,001-50,000	14	2.9
$50,001-60,000	2	20.0
Over $60,000	14	12.9
No Response	3	4.3

Table 2 depicts nutritional characteristics. Nearly 63% of producers practiced rotational grazing; 13% indicated they knew the stocking rate for their beef cattle; 47% indicated they knew the stocking rate for their meat goats. The mean stocking rate for beef cattle was three per acre, and the mean stocking rate for meat goat was fifteen per acre (not shown in table). Also, 63% fed

their animals a combination of forage (directly from pasture), hay, and concentrate. About 81% purchased hay; 9% cut and baled their ~~own~~ hay; and 6% did both. It is not surprising that a majority of producers purchased hay; this is done to supplement grazing in the months when direct grazing from pastures is not enough. Almost 53% had grasses (e.g., Bahia, Bermuda, or Rye) in their pastures; less than 10% chose other grasses, such as Star Grass, Eastern Gamma Grass, and Grab Grass); 34% had both grasses and legumes (e.g., Clover, Lespedeza, or Kudzu) in their pastures. Also, 40% regularly conducted soil tests for their pastures; however, 59% did not do so regularly. That said, 26% fertilized their pastures based on soil tests, and 31% fertilized once or twice a year. Although the majority of producers were feeding correctly, a majority of them were not conducting regular soil tests. This practice implies these producers were not aware of the true conditions of their soils. The results are by and large in agreement with Bartlett et al. (2016) in which they reported that a majority of producers practiced rotational grazing; fed a combination of forage on pasture, hay, and concentrate, and did not conduct soil tests regularly. Tessemma (2015) and Fikru and Gebeyew (2015) also reported that a majority of producers using grazing on pasture as the major way of feeding animals, particularly beef cattle, sheep, and goats.

Table 2. Nutritional Characteristics (N = 70)

Variable	Frequency	Percent
Rotational Grazing		
Yes	44	62.9
No	26	37.1
Stocking Rate		
Beef Cattle	9	12.9
Meat Goat	33	47.1
Don’t Know	1	1.4
No Response	27	38.6
Type of Feed		
Forage (directly from pasture)	9	12.9
Hay only	1	1.4
Concentrate only	1	1.4
Forage and Hay	11	15.7
Hay and Concentrate	3	4.3
Forage, Hay, and Concentrate	44	62.9
No Response	1	1.4

Table 2. Continued

Variable	Frequency	Percent
Hay Acquisition		
Purchase	57	81.4
Cut and Bale	6	8.6
Both	4	5.7
Other	1	1.4
No Response	1	1.4
Not applicable	1	1.4
Forage Materials in Pasture		
Grasses	37	52.9
Legumes	2	2.9
Both	24	34.3
Other	5	7.1
No Response	2	2.9
Soil Tests for Pasture Regularly		
Yes	28	40.0
No	41	58.6
No Response	1	1.4
Fertilize Pastures		
Based on Soil Tests	18	25.7
Once a year	14	20.0
Twice a year	8	11.4
Other	1	1.4
No Response	29	41.4

Table 3 shows health characteristics. Approximately 54% of producers reported that they had parasite problems; 36% used anthelmintics only to treat parasites, and 9% used a combination of methods to deal with the problem; 34% dewormed their animals monthly; 26% dewormed their animals quarterly; 19% dewormed yearly, and 10% dewormed at other intervals, e.g., semi-annually. Also, 47% said that they used veterinary services and 50% do not. Additionally, 39% indicated that they have had a major disease outbreak on their farms, and 54% had not had such an occurrence. Those who have had a major disease outbreak handled the problem by calling in the vet, 23%; removed sick animals, 6%, and eradicated sick animals, 9%. Also, 83% indicated they quarantined newly purchased animals before introducing them to their herds. The quarantine periods varied; 23% quarantined for 14 days; 10% quarantined for 21 days; 19% quarantined for 28 days, and 30% quarantined based on other time periods (e.g., 30, 54, 60, 90, and 180 days). The findings regarding parasites and quarantining are generally in agreement with Bartlett et al. (2016), 59 and 79% compared to 54 and 83%. However, the proportion that quarantined newly purchased animals (83%) is higher than that of the 40% reported by the USDA APHIS (2012a). Although a majority used anthelmintics or multiple means to treat parasites, they might have to use an integrated parasite management approach, with the help of an expert, such as an animal scientist or veterinarian, to manage the parasite problem. The

findings on deworming and using a veterinarian are in opposition to those found by Bartlett et al. (2016) who reported 66% dewormed quarterly and yearly and 77% used a veterinarian compared to corresponding values of 45 and 47% in the present study. Also, the proportion that used a veterinarian (47%) is lower than that of the 62% reported by USDA APHIS (2012b).

Table 3. Health Characteristics (N = 70)

Variable	Frequency	Percent
Parasite Problem		
Yes	38	54.3
No	32	45.7
Handling Parasite Problem		
Treat with Anthelmintics	25	35.7
Call Vet	4	5.7
Home Remedy	2	2.9
Multiple	6	8.6
No Response	1	1.4
Not Applicable	32	45.7
Deworming		
Monthly	24	34.3
Quarterly	18	25.7
Yearly	13	18.6
Other	7	10.0
No Response	1	1.4
Not Applicable	7	10.0
Veterinary Services		
Yes	33	47.1
No	35	50.0
Not Response	2	2.9
Major Disease Outbreak		
Yes	27	38.6
No	38	54.3
No Response	5	7.1
How did you Handle Problem?		
Called Vet	16	22.9
Removed Sick Animals	4	5.7
Eradicated Sick animals	6	8.6
Other	1	1.4
No Response	5	7.1
Not Applicable	38	54.3

Table 3. Continued

Variable	Frequency	Percent
How did you Handle Problem?		
Called Vet	16	22.9
Removed Sick Animals	4	5.7
Eradicated Sick animals	6	8.6
Other	1	1.4
No Response	5	7.1
Not Applicable	38	54.3
Quarantine		
Yes	58	82.9
No	12	17.1
Length of Quarantine Period		
14 days	16	22.9
21 days	7	10.0
28 days	13	18.6
Other	21	30.0
No Response	1	1.4
Not Applicable	12	17.1

Table 4 shows processing characteristics. Nearly 99% of the producers sold their animals live. This practice implies that there is very minimal processing of animals into beef, goat meat, or related products. Plausible reasons for this may be due to the smallness of producers' operations, an aversion of the labor and capital investment involved in processing; they may be providing their customers what they want. An extension of the latter reason may be that customers want to purchase animals live and do their own slaughtering; hence, paying lower prices. This finding is also in line with Bartlett et al. (2016) and USDA APHIS (2012c). Bartlett et al. reported that 87% of small producers in their study sold animals live. USDA APHIS reported that only 2% of small livestock operations in the South used slaughter facilities. A key reason also not to be overlooked is the challenges for setting up a local slaughter facility indicated, for example, by Ellsworth (2015), Leamy (2014), Dickerson et al. (2013), and Gwin et al. (2013).

Table 5 reflects the chi-square test results between selected production characteristics (rotational grazing, type of feed, soil testing, and veterinary services) and socioeconomic variables. Whether producer practiced rotational grazing or not was significantly affected by household income, $p = 0.055$. This means that household income is not independent of whether producer practiced rotational grazing or not; the null hypothesis that this variable is independent of rotational grazing is rejected. For annual household income, because of more resources, those with higher incomes will tend to practice rotational grazing more than those with lower levels of income, because of more resources at their disposal to invest in some such activities. Farming status, gender, race/ethnicity, age, education, and annual household income were not significant. The null hypotheses that these variables are independent of each other are not rejected. This finding is

in disagreement with Bartlett (2016) for Alabama who found farming status and education to be significant.

Table 4. Processing Characteristics (N = 70)

Variable	Frequency	Percent
How Animals are Sold		
Live	69	98.6
Slaughtered	0	0.0
Both	1	1.4
Safety Practices Followed		
No Response	1	1.4
Not Applicable	69	98.6

Type of feed was significantly affected by race/ethnicity, p = 0.000. This means that race/ethnicity is not independent of the type of feed fed to animals; the null hypothesis that this variable is independent of the type of feed fed to animals is rejected. For race/ethnicity, it could imply that more White producers than Black producers feed appropriately, possibly because White producers generally have more resources than Black producers and will be able to use these resources to feed the animals better. Farming status, gender, age, education, and household income were not significant. The null hypotheses that these variables are independent of each other are not rejected. At least in terms of race/ethnicity, the findings are similar to those found by Bartlett et al. (2016).

Table 5. Chi-Square Tests between Production Characteristics and Socioeconomic Variables

Variable	df	χ^2	p value
Rotational Grazing			
Farming Status	2	0.321	0.852
Gender	1	2.203	0.138
Race/Ethnicity	3	0.891	0.828
Age	5	3.486	0.626
Education	5	2.174	0.825
Household Income	8	15.236**	0.055
Type of Feed			
Farming Status	12	12.837	0.381
Gender	6	8.879	0.181
Race/Ethnicity	18	79.115***	0.000
Age	30	25.775	0.687
Education	30	18.634	0.947
Household Income	48	46.288	0.543

Table 5. Continued

Variable	df	χ^2	*p* value
Soil Testing			
Farming Status	4	17.479***	0.002
Gender	2	1.362	0.506
Race/Ethnicity	6	6.645	0.355
Age	10	11.013	0.356
Education	10	8.704	0.560
Household Income	4	2.605	0.626
Veterinary Services			
Farming Status	4	2.605	0.626
Gender	2	7.981***	0.018
Race/Ethnicity	6	4.582	0.598
Age	10	11.830	0.297
Education	10	9.326	0.501
Household Income	16	13.137	0.633

*** Significant at 1%; **Significant at 5%

Soil testing was significantly affected by farming status (full-time or part-time), $p = 0.002$. This result means that farming status is not independent of soil testing; the null hypothesis that this variable is independent of soil testing is rejected. For farming status, it could mean that full-time farmers are more able to devote time and other resources to soil testing compared to part-time farmers because a typical part-time farmer is limited in time. Gender, race/ethnicity, age, education, and household income were not significant. The null hypotheses that these variables are independent of each other are not rejected.

Veterinary services were significantly affected by gender, $p = 0.018$. This implies that gender is not independent of using veterinary services; the null hypothesis that these variables are independent of each other is rejected. For gender, it probably means that males more so than females are likely to use veterinary services for their animals. Farming status, race/ethnicity, age, education, and annual household income were not significant. The null hypotheses that these variables are independent of the use of veterinary services are not rejected. The results, again, are in opposition to Bartlett et al. (2016). They found education significant. In general, the differences in the chi-square results with Bartlett et al. (2016) could be attributed to geographical differences.

Conclusion

The study analyzed the characteristics and practices of selected Florida small livestock producers, focusing on production and processing. Specifically, it identified and described socioeconomic characteristics; described and assessed selected production and processing characteristics and practices; and examined the relationships between socioeconomic characteristics and other characteristics or practices. Data were collected through convenience sampling and analyzed using descriptive statistics and chi-square tests. The socioeconomic

characteristics showed more part-time farmers than full-time farmers (60 v. 34%); equal proportions of male and female producers (50% each); slightly more White producers than Black producers (47 v. 41%); more middle-aged producers than other groups (52 v. 48%); more producers with at most a two-year/technical degree or some college education than a four-year college degree (73 v. 23%); and more producers with annual household incomes of $40,000 or less than with over $40,000 annual household income (60 v. 36%).

Also, most (63%) practiced rotational grazing, and a majority (63%) fed a combination of forage (direct from pasture), hay and concentrate. Nearly 59% did not conduct soil tests regularly for their pastures; however, 40% did so. Almost 54% had parasite problems, and treated primarily with anthelmintics or a combination of methods; 45% dewormed animals quarterly or yearly; 47% used veterinary services; 83%quarantined animals before introducing them into their herds, and 99% sold animals live. The chi-square tests showed that farming status, gender, race/ethnicity, and annual household income had statistically significant relationships with selected production characteristics; that is, four out of six of the socioeconomic variables..

Based on the findings, a majority used rotational grazing, and also, fed a combination of feeds. However, the use of feeding concentrates should be discouraged as much as possible as this increases feeding cost. Having adequate and appropriate forage should be encouraged, and in turn, this is tied to the stocking rate. In times of abundant forage, the stocking rate is high, and in times of inadequate forage, the stocking rate is low. That over half of the producers were not conducting soil tests regularly and had parasite problems was a cause for concern. Furthermore, a majority did not use veterinary services. The preceding, notwithstanding, there is a need for a comprehensive education and training program that constantly educates producers on the importance of good feeding, regular soil tests, and dealing with minimizing the incidence of internal parasites. The not-so-surprising finding that processing of livestock is very minimal or almost zero should be dealt with. The reason is if producers process their livestock they would make more money because value-added products on average sell higher than raw products. At least, they could slaughter and dress animals for customers, and at most they could process meat into other products such as premium cuts, burger, and sausages. Perhaps, they could be assisted with grants to acquire micro-processing equipment that will allow them to slaughter livestock and/or process meat. Also, since farming status, gender, race/ethnicity, and annual household income appear to be important relative to the selected production characteristics, these factors should be considered when developing education training programs to assist producers in the study area. Future studies are recommended involving more in-depth statistical analysis of the data.

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